PATENT APPLICATION

AN iPOS TRANSACTION TERMINAL

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AN IPOS TRANSACTION TERMINAL

BACKGROUND

This invention relates to point-of-sale POS systems and retail stores. More specifically, this invention relates to transaction terminals at POS locations in small retail stores.

Brick-and-mortar retailers may be divided into three classes based on the number of registers at a store. A tier-1 retailer may have, say, twenty-six (26) or more cash registers at one store. A tier-2 retailer may have 3 to 25 cash registers. Tier-3 retailers have one or two cash register per store. (These tiers may overlap at their boundaries.)

The cash registers at the tier-1 and tier-2 stores, termed "electronic cash registers" or "ECRs," tend to be qualitatively different from the registers at tier-3 stores. A tier 1-tier 2 cash register may cost $5,000 or more. For its expense, an ECR is programmed or programmable to handle activities beyond that of a cash register. In an integrated POS system, an ECR may communicatively couple with a POS device such as a check reader or a magnetic-strip reader. The ECR has sufficient intelligence to control the POS device, say, to obtain credit- or debit-card information from the magnetic-strip reader, combine it with the transaction total that the ECR has computed and forward it all to an external payment processor for authentication and approval. The IBM ECR model 4690, available from International Business Machine Corporation, Armonk, NY, is an example of a prior-art ECR.

In comparison, the cash registers of tier-3 retailers are typically much less sophisticated. These cash registers cost about $500 to $800 — significantly less than the tier 1-tier 2 ECRs. For their affordability, stand-

beside cash registers are not able to control POS devices co-located with the cash register. Any magnetic-strip reader located with such a tier-3 register, for example, itself possesses the intelligence to send card information to a remote payment processor for authentication.

Figure 1 illustrates a prior-art POS transaction system **200** for a tier-3 POS location. The POS transaction system **200** includes a cash register **210**, a cashier-side keypad **220** (optionally integrating a check/magnetic-strip reader **221** and a printer **222**), a PIN pad **230** and a communications link **240**. The link **240** communicatively connects the keypad **220** and the PIN pad **230**.

In a retail system including the transaction system **200** and a remote payment processor **300**, a link **400** communicatively connects the transaction system **200** — through its keypad **220** — to the payment processor **300**. Notably, the cash register **210** and the cashier-side keypad **220** do not communicate.

The OMNI models 460 and 470, available from Verifone, a division of Hewlett-Packard Company, Palo Alto, California, with their printer 900 and CR 600 check-reader options, are examples of prior art keypads **220**. The OMNI 460 has automatic-payment-processing and receipt-printing capabilities. The OMNI 470 combines a payment terminal, a printer and a PIN pad. Both OMNI terminals can transfer data via modem. Eclipse-brand payment terminals convert paper checks into electronic items for instant funds transfer from a customer's account to the merchant's.

Hypercom, Inc., Phoenix, Arizona, makes T7 and T8 series of transaction terminals. The T7 series include a 35-key keyboard, LCD display, a card reader and a receipt printer.

IVI Checkmate, Roswell, Georgia, makes an eN and Elite series of transaction terminals with PIN-pad and receipt-printer peripherals. Most of these terminals have direct-dial capability, integrated card readers and an LCD. Functions such as check reading, thermal receipt printer and

wireless connection are optional.

In this tier-3 environment, processing a credit-card payment in the tier-3 environment involves the cashier determining the dollar amount of the transaction using the cash register **210** and sliding the credit card through the check/magnetic-strip reader **221**. The cashier then enters the transaction dollar amount into the keypad **220**. The MSR **221** provides the requisite card information such as card number and expiration date. The keypad **220** then (dials and) communicates with the remote payment processor **300** to validate the transaction. On validation, the printer **222** prints a paper receipt which the customer then signs.

Processing a debit-card payment is similar: Instead of signing a paper receipt, the customer enters a PIN on the PIN pad.

Such a credit or debit transaction may take 6 to 22 seconds, depending on the type of connection with the remote payment processor. The customer idly waits for the transaction approval. Except for the entry of a PIN (if ever necessary), the customer does not interact at all with the transaction system **200**.

While such a setup allows the merchant to use credit- or debit-cards as payment for goods or services at a cost much less than with ECRs, the setup obliges the retailer to forgo certain additional sources of revenue. The conversion of the customer wait time into money, for example, is a lost opportunity.

Accordingly, the art seeks a tier-3 POS environment that is less costly than the tier-1 and tier-2 environments but nonetheless offers the opportunity to convert the idle times of the customer into potential revenue.

These and other goals of the invention will be readily apparent to one of skill in the art on reading the background above and the description below.

SUMMARY

Herein are described apparatus and methods for transaction processing. The apparatus may be a transaction terminal including a keypad, a circuit for interacting with the transaction customer and a link communicatively connecting the keypad and the customer-interaction circuit.

The cashier may interact with the keypad, while the customer (and not the cashier) may interact with the customer-interaction circuit. The link may communicate a dollar amount for the transaction between the keypad and the customer-interaction circuit.

Accessories for the keypad may include a check reader, a display or a receipt printer. Accessories for the customer-interaction circuit may include a smart-card reader, a magnetic-strip reader and biometric readers.

The customer-interaction circuit may include a port for connection to a remote service provider. That port may be the only remote-access port in the transaction terminal.

The customer-interaction circuit may include a virtual keypad, and the circuit itself maybe programmed to capture a personal identifier number by means of that virtual keypad. The customer-interaction circuit may include virtual paper, and the circuit itself may be programmed to capture a signature by means of the virtual paper.

A cash register at the POS location with the transaction terminal may not be communicatively coupled to the transaction terminal.

A method for authenticating a transaction at a POS location may include engaging in a transaction at the POS location, thereby generating a dollar amount for the transaction. A transaction dollar amount is entered into a keypad and then communicated from the keypad to a customer-interaction circuit. Details of the transaction, including the dollar amount, are communicated to a remote service

provider for authentication. During the step of entering and both steps of communicating, the customer-interaction circuit interacts with the customer. Between the steps of communicating, the transaction dollar amount maybe displayed on the customer-interaction circuit for the customer, and the customer may approve the transaction dollar amount.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 illustrates a prior-art POS transaction system for a tier-3 POS location.

Figure 2 illustrates a retail system incorporating an embodiment of the invention.

Figure 3 illustrates the point-of-sale (POS) transaction terminal of **Figure 4**, according to one embodiment of the invention.

Figure 4 illustrates a transaction system incorporating an embodiment of the invention.

Figure 5 schematically illustrates a customer-response unit, according to one embodiment of the invention.

DESCRIPTION OF SPECIFIC EMBODIMENTS

Figure 2 illustrates a retail system **100** incorporating an embodiment of the invention. The retail system **100** includes one or more merchants **110**, one or more remote payment processors **120**, one or more electronic-receipt service providers **140**, one or more customer-relations managers **150** and a communications link **130.**

The link **130** communicatively couples the merchant **110** to the service providers **120**, **140**, **150**. Where the link **130** is an internet, the merchants **110** and service providers **120**, **140**, **150** are each a host on the internet **130**. Any one host may communicate with any other one using that internet **130**. (Any number of these "hosts" may be only nominally so, their actual status more likely to depend on the directness of their connection to that internet **130**, for example, through optional service

providers not shown.)

A merchant **110** may be a small retailer with, say, 1or 2 cash registers. Example merchants **110** include convenience stores, restaurants, hospitality providers (barkeeps, innkeepers, etc.) and rental-car agencies.

A service provider **140** may provide an electronic-receipts repository for receiving and storing transaction records. The service provider may provide an electronic-receipts service for manipulating a transaction record — retrieving and forwarding it on demand, for example. The website www.ReceiptCity.com, made available by ReceiptCity.com, San Jose, California, is an example of an electronic-receipts service **140**.

The service providers **120** support the transactions of a merchant **110**. An application service provider (ASP) **120** may verify credit or debit cards or may authorize credit- or debit-card transactions.

The service-provider **150** may be an advertisement server. Doubleclick.com, New York, New York, is an example of a service provider **150**. Indeed, the service provider **150** may serve up any content that a customer may find interesting or that may provide useful information. (For example, the lack of an (affirmative) customer response to an advertisement, promotion or survey is of itself an interesting response.)

The merchant **110** includes a transaction system **111** incorporating an embodiment of the invention. **Figure 4** illustrates that POS transaction system **111**, including a cash register **210** and an iPOS transaction terminal **1111**.

Figure 3 illustrates an interactive point-of-sale (iPOS) transaction terminal **1111** according to one embodiment of the invention. The iPOS transaction terminal **1111** may include a prior-art remote cashier-side keypad (RCK) **220**, a customer-response unit (CRU) **500** and a communications link **600**. The link **600** communicatively couples the RCK **220** and the CRU **500**.

The RCK **220** typically includes a keypad **221** and an LCD display **221**, and less often a printer **222**, a check reader **221** or both. In use,

the RCK assists the cashier. The RCK **220** may receive from the cashier the dollar amount of a given transaction for debit- or credit-payment processing, may print receipts or may read checks.

The CRU **112** interacts with the customer to complete or enhance the transaction. **Figure 5** schematically illustrates a CRU **500**, according to one embodiment of the invention. The CRU **500** may include a processor sub-system **510**, a biometrics sub-system **520**, an input sub-system **530**, an output sub-system **540**, a payment sub-system **550**, a communications sub-system **560** and a bus **570**. The bus **570** communicatively couples all of the biometrics, input, output, payment and communications sub-systems **520, 530, 540, 550, 560** to each other and to the processor sub-system **510**.

The processor sub-system **510** includes a CPU **511**, a memory **512** and a bus **513**. The memory **512** includes random-access memory (RAM) **5122** and may include an optional flash memory **5121**. The bus **513** communicatively couples the CPU **511** and the memory **512** and may be wholly or partly integral with the bus **570**.

The memory **512** includes software (not shown) controlling the CRU **500** according to its roles described herein. The memory **512** also contains drivers and other software as necessary to operate the input, output and payment sub-systems **530, 540, 550**.

The biometrics sub-system **520** electronically captures biological information such as fingerprints, retinal images or facial features.

The input sub-system **530** may include a touch screen **531**, and the output sub-system **540** may include a display **541** that is preferably a color liquid crystal display (LCD). The touch pad **531** and the display **541** may combine to create a virtual PIN pad for numeric entry or virtual paper for electronic signature capture, as are known in the art.

The payment sub-system **550** may include a magnetic-strip reader **551**, a smart-card processor **552** and a bus **553**. The bus **553** may communicatively couple the magnetic-strip reader **551**, the smart-card

processor **552** and the bus **570**. The bus **553** may be wholly or partly integral with the bus **570**. (In one embodiment, the input system can also handle the other types of payment mentioned herein.)

The communications sub-system **560** includes a low-bandwidth port **564**, a high-speed communications port **561** and a bus **565**. The bus **565** communicatively couples the ports **564**, **561** to the bus **570**. The bus **565** may be wholly or partly integral with the bus **570**.

The low-bandwidth port **564** is preferably serial, particularly an RS-232 or RS-485 port. The high-bandwidth port **564** is preferably a local or wide area network connection, such as the Internet over a digital subscriber loop or line (DSL).

In an example transaction, a customer uses the CRU **112** to select a payment option. In response, the CRU **112** prepares to accept the selected payment method. The customer inserts his card, swipes his card, inserts his check or otherwise presents his payment method as determined by the chosen option. For debit cards, the customer enters a PIN using the virtual PIN pad of the CRU **112**.

At some point before the CRU **112** completes its communications with the remote payment processor **120**, the cashier enters the dollar amount of the transaction, using the RCK **220**. The cashier's data entry is typically asynchronous to the customer's activities. The cashier-side keypad **220** communicates this dollar-amount information to the CRU **112**, using the link **113**. The CRU **112** transfers this and other transaction information to the remote payment processor **120** and waits for an approval.

While the CRU **112** waits for the service provider **120** to validate the transaction, the CRU **112** communicates with the customer-relations manager **150** over the link **130** to receive content for display to the customer. The CRU **112** typically also displays transaction information (and card information, if applicable).

On approval of a credit transaction, the CRU **112** prompts for

the customer's signature. The signature may be electronic.

The CRU **112** prints a receipt which the cashier hands to the customer. The CRU **112** then may transmit a record of the transaction (and transaction details such as an electronic signature) to the electronic-receipts service **140**.

The retail system **100** offers tier-3 retailers targeted-marketing opportunities at the point of sale while processing credit and debit transactions.

The numerous embodiment of the iPOS transaction terminal permits the small, tier-3 retailer to minimize cost by choosing an iPOS transaction terminal **1111** configured exactly for that small retailer's business. The retailer need not pay for functionality that it may never use.

Indeed, the invention now being fully described, many changes and modifications that can be made thereto without departing from the spirit or scope of the appended claims will be apparent to one of ordinary skill in the art.

This specification incorporates by reference all publications and patent applications mentioned herein, to the same extent if the specification had specifically and individually incorporated by reference each such individual publication or patent application.